

**RPS SOLAR CARVE-OUT
DISCUSSION AND ANALYSIS OF PROGRAM COSTS**

April 2, 2010

Under the provision of the Green Communities Act of 2008 for a Distributed Generation carve-out of the RPS program, DOER has established a solar PV carve-out beginning in 2010. The Solar Carve-Out was anticipated as the next phase of the establishment of a growing and robust solar industry in Massachusetts when, in 2007, the successful Commonwealth Solar Rebate Program was created. That program was implemented by the MA Clean Energy Center and began the growth of solar installations in MA from 5 MW to nearly 30 MW in less than 2 years. During this time, approximately 1200 solar projects were awarded rebates, and the solar industry employment in MA has more than doubled over two years.

DOER has designed the innovative Solar Carve-Out with extensive input from a series of stakeholder meetings and an on-going regulatory procedure. The program provides important and necessary price support mechanisms for the solar industry, while providing significant protections for ratepayer impacts.

In early March, DOER provided an *Analysis of SREC Flows and Costs* which presented a simple arithmetical accounting of program costs under a range of scenarios, in order to establish program cost parameters at upper and lower bounds, and to illustrate the magnitude of resources that could be available to support continued growth of solar PV installation in Massachusetts over the long term. This analysis was not intended to be predictive of price impacts, as the modeling did not account for program design mechanisms available to reduce costs, nor did it account for observed and projected declines in solar energy costs over time.

This memo provides further explanation of the ratepayer impact mitigation strategies contained in the program design, details mechanisms to capture the expected decline in solar PV installed costs in lower program costs, and provides a range of program costs under likely market conditions. When the range of cost controls and expected market dynamics are fully considered, the program cost of the Solar Carve-Out program averages \$75 million annually over the 2010-2020 timeframe.

Design Protections for Ratepayer Impacts

- Unlike some RPS programs, which sometimes experience years of short supply and dependence on ACP level prices (which establish ceilings on the cost of supporting renewable energy), the Minimum Standard of the Solar Carve-Out is adjusted annually in a manner that balances S-REC supply and demand. This annual balancing will reduce demand growth if a shortage occurs, thereby reducing price

pressures in the following compliance year. For this reason, average S-REC prices should be well below ACP levels in most years, and never close to ACP levels in successive years.

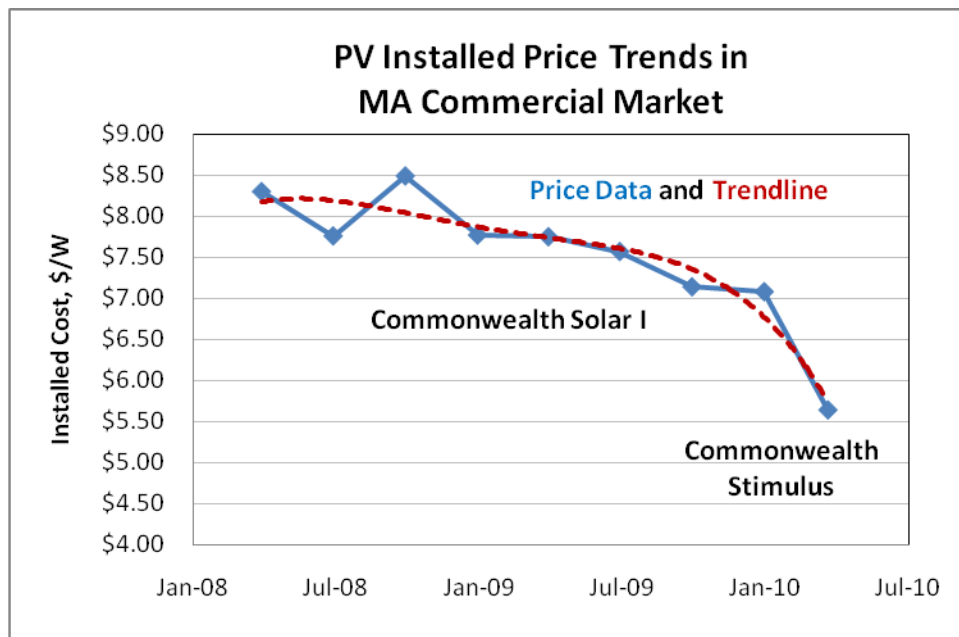
- The Solar Carve-Out program creates a market that encourages bilateral contracts of varying terms (likely two to seven years) to lock in S-REC prices below the ACP Rate. DOER is aware that market participants are already engaged in these sorts of discussions. These market contracts will reduce compliance costs relative to the ACP Rate.
- The experience of Commonwealth Solar suggests that well structured market incentives which increase industry scale will result in reduced unit costs. If, as expected, solar PV prices continue to decline and development in MA exceeds the minimum standard, the Auction Opt-In Term will be reduced from its initial value of 10 years, thereby reducing the timespan over which the program assures new projects the minimum \$300/MWh S-REC price.
- DOER maintains discretion to reduce the ACP Rate from its initial value of \$600/MWh at a rate of 10 percent per year if the Department determines that the rate is unnecessarily high for solar development to continue its progress. In an environment where costs of installed solar steadily decline, ACP price will also decline, reducing the upper-bound cost of price support under S-REC.
- Qualified projects generating beyond their Auction Opt-In Terms are not provided the minimum price support of the auction, and will likely negotiate either spot market or contract prices for these S-RECs well below the fixed auction price.
- The Solar Carve-Out design provides for a lower ACP Rate (\$325/MWh) for load under existing contracts (prior to 1/1/2010) with competitive retail suppliers, reducing the short-term impact on suppliers that face challenges meeting initial requirements.

PV Price Trends and Projections

Due to global market conditions and local ramp-up of solar industry capacity and competition, MA has experienced significant reduction in installed PV prices since the beginning of the Commonwealth Solar program. Global panel prices have fallen due to excess manufacturing capacity and reduced silicon prices, and are expected to continue to decline. Notably, installation and soft marketing costs for PV in MA has declined due to the ramp up of the industry. As the Solar Carve-Out program greatly expands this market further, even greater cost savings are expected.

The following chart provides the installed PV price points observed in MA over the past 2½ years. Generally, prices have gone from \$8.1/W in 2008, to \$7.4/W in 2009, and now \$5.6/W in 2010; a total price reduction of 30%. Price declines are likely to continue

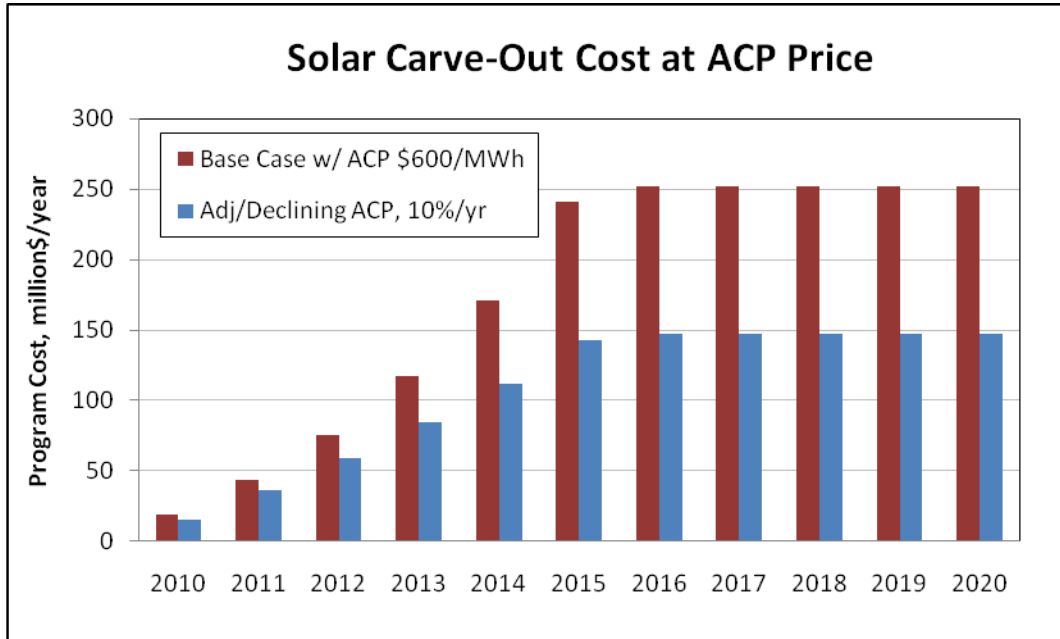
under the S-REC program, since the larger installations that S-RECs support capitalize on both falling solar panel prices and scale efficiencies in installation. U.S. DOE Secretary Chu recently stated his belief that PV prices will decline from \$4/W (installed) to \$2/W in about 10 years – a level that would achieve price parity with conventional electricity (9 to 12 cents/kWh in recent years) in the New England market.



Program Cost Analysis under Adjusted and Declining ACP Rate

Our March report documented a maximum cost exposure to the ratepayers of over \$250 million per year based on full program compliance at the \$600/MWh ACP rate – that is, the price cap for S-RECs. Subsequent to this analysis, DOER decided to reduce the ACP Rate to \$325/MWh for load under existing contracts with the competitive retail electric suppliers. This will reduce compliance costs in the first couple years of the program while these contracts expire. Additionally, the analysis did not assume that DOER would use its discretion under the regulations to reduce the ACP Rate (by up to 10% per year). Given solar PV price trends and if further reductions are realized, DOER may likely use that discretion to lower the solar subsidies.

The following chart shows the significant reduction in program cost to ratepayers compared to the fixed \$600/MWh ACP rate as a result of accounting for the reduced ACP for existing contracts (savings diminish over the first few years of the program) and DOER using its discretion to reduce the ACP Rate by 10%/year until the rate reaches \$350/MWh. These changes alone reduce the maximum potential exposure of ratepayers (in 2016) to \$147 million.



Program Cost Analysis under Market S-REC Price Levels

It is also likely that, once the program is in operation, S-RECs will be settled not only well below the ACP rate but even potentially below the auction price of \$300/MWh. As evidenced in the mature RPS Class I market in Massachusetts, a well-functioning RPS program under balanced supply and demand demonstrate market prices for RECs well below the ACP Rate. In RPS Class I, REC prices for the past couple of years have settled in the \$25-\$30/MWh range, less than half the ACP Rate of approximately \$60/MWh. This experience implies that as the program matures and the market is balanced, REC prices should settle at the marginal cost of entry for the most competitive new generation coming on line. For the Solar Carve-Out program, this price would track the declining cost of PV installations. Even with the fixed Auction Price, DOER would expect solar developers to establish contract prices for S-RECs below the auction price in order to have the surety of a contract for project financing.

The following chart provides an analysis of the Solar Carve-Out program costs under a likely scenario where S-RECs are settled at prices well below the ACP Rate and which decline over time. In this analysis, average S-REC prices are assumed to begin at \$400/MWh, and decline over time as shown. In this case, the annual program cost reaches just over \$100 million at its peak (in 2015-16), and averages \$75 million over the 2010-2020 timeframe.

